DL COURSE

COURSE - 1 Date: 21/09/24

WEEK 1: Introduction to Deep learning

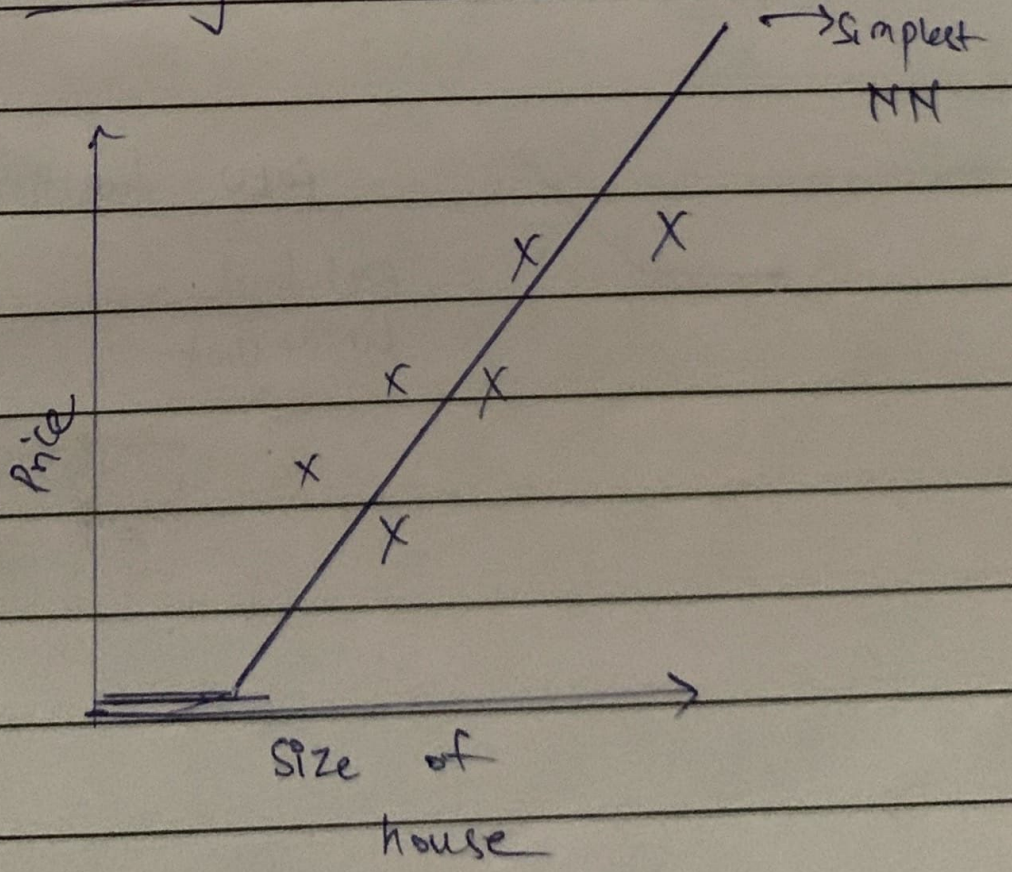
→ Intro on Deep learning

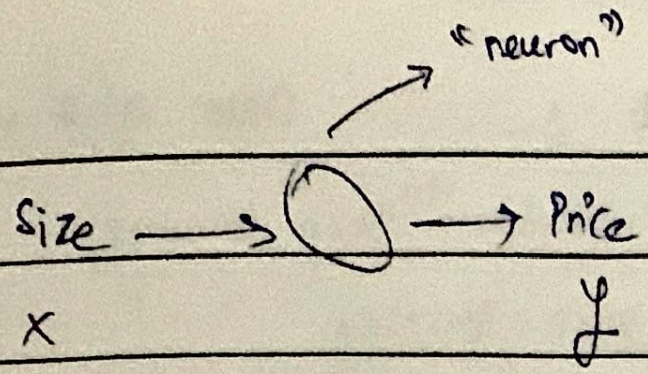
→ Rise in Deep learning and increasing usage AI tools and deep learning implementation.

→ What is a Neutral Network?

Example:

Housing Price Prediction:



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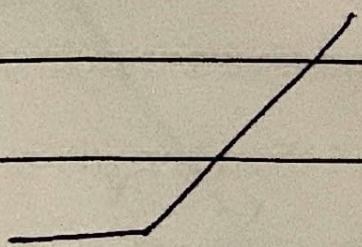
Consider the neuron to be the smallest neural network that is the implementation of line fit on the graph above.



ReLU function

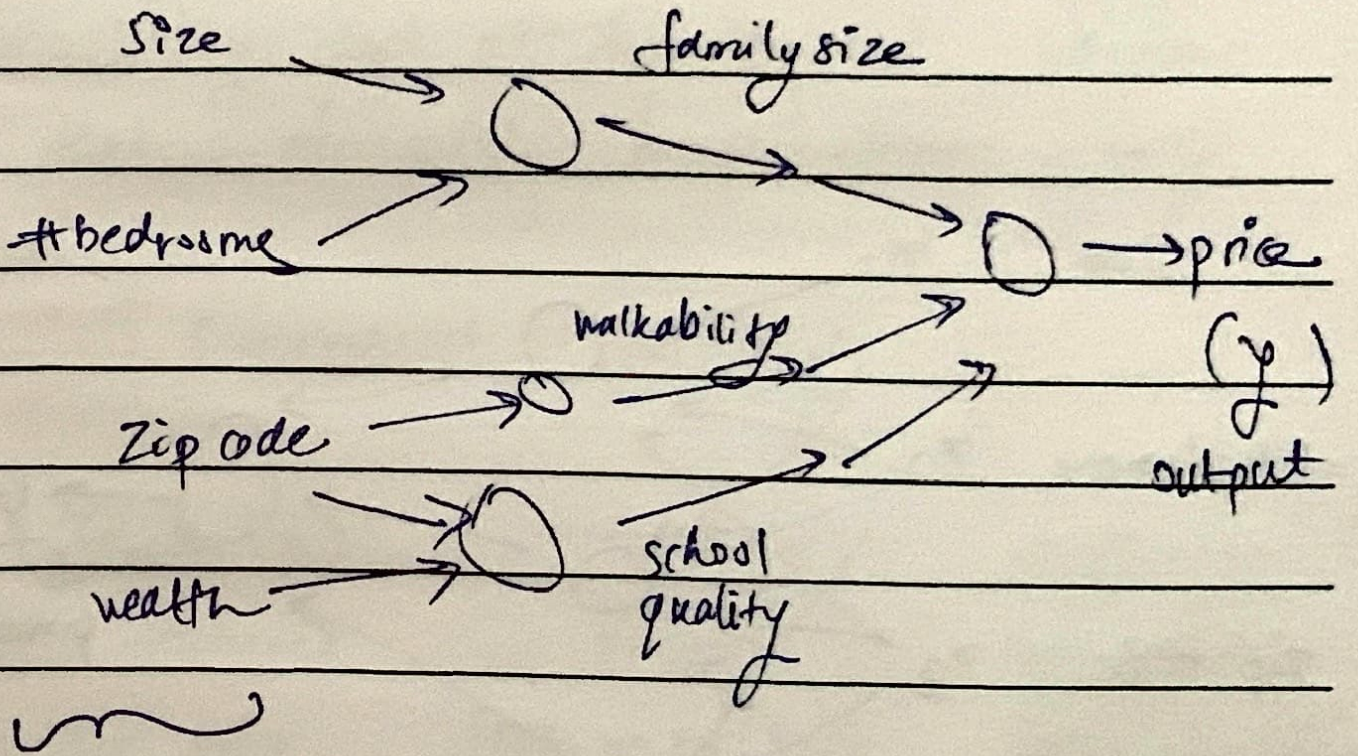
Rectified Linear Unit

considering; Date:

Single neuron → a tiny little neural network

Large neural network → taking many of the single neurons and stacking them together.

Housing Price Pred:




4 inputs
(x)

Here the single neurons are stacked together.

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you manage the NN is that when it is implemented, you need to just input $x$ and output $y$ for your training set and the these things in middle, they will figure out by itself.

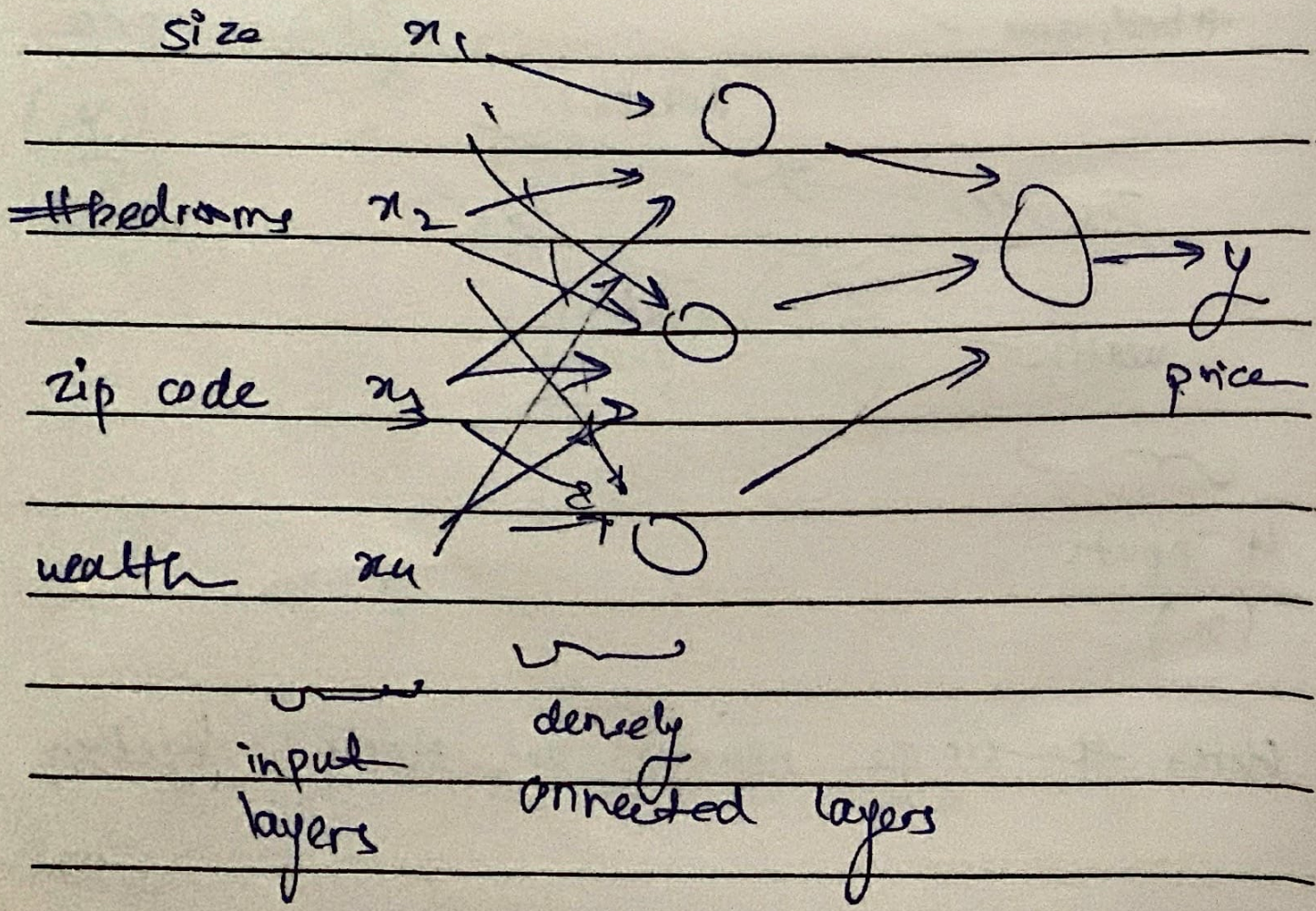

Image → mostly CNN

for sequence data (like Audio) → RNN mostly

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Every input feature is connected to every one of those circles in middle.

Given enough data about x & y, enough training examples with both x & y, neural networks are remarkably good at figuring out functions that accurately map from x to y.

## Supervised Learning :

| Input (x) | Output (y) | Application |
|---|---|---|
| Home features | price | Real Estate |
| Ad, User info | Click on Ad? (0/1) | Online advertising |
| Image | Object (1, ..., 1000) | Speech recognition |

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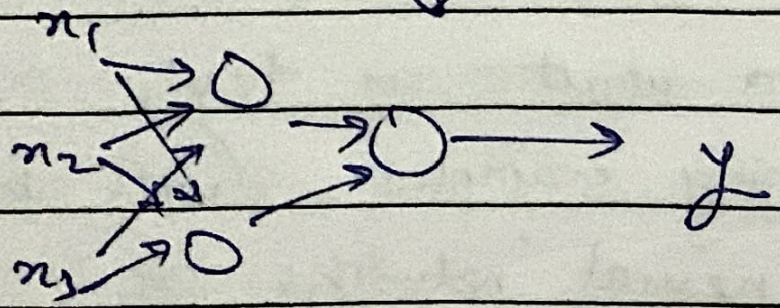
NN examples :

(1) Standard NN




Input — Densely connected layer — output

(2) Convolutional NN (CNN)

(3) Recurrent NN (RNN)

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## Structured Data:

## Unstructured Data:

Databases of Data:

~~→~~ features of something

Eg:

| Size | #Bedrooms | Price |
|---|---|---|
| ~~1085~~ | 4 | $4M |
| ⋮ | ⋮ | ⋮ |
| 3546 | 5 | $5M |
| 4056 | 3 | $3M |

Audio

Images

Text

| UserAge | Ad Id | ... | Click |
|---|---|---|---|
| 41 | 9563 | ... | 1 |
| 88 | 4571 | ... | 1 |
| ⋮ | ⋮ | ⋮ | ⋮ |
| 25 | 2541 | ... | 0 |
| 45 | 3562 | ... | 1 |

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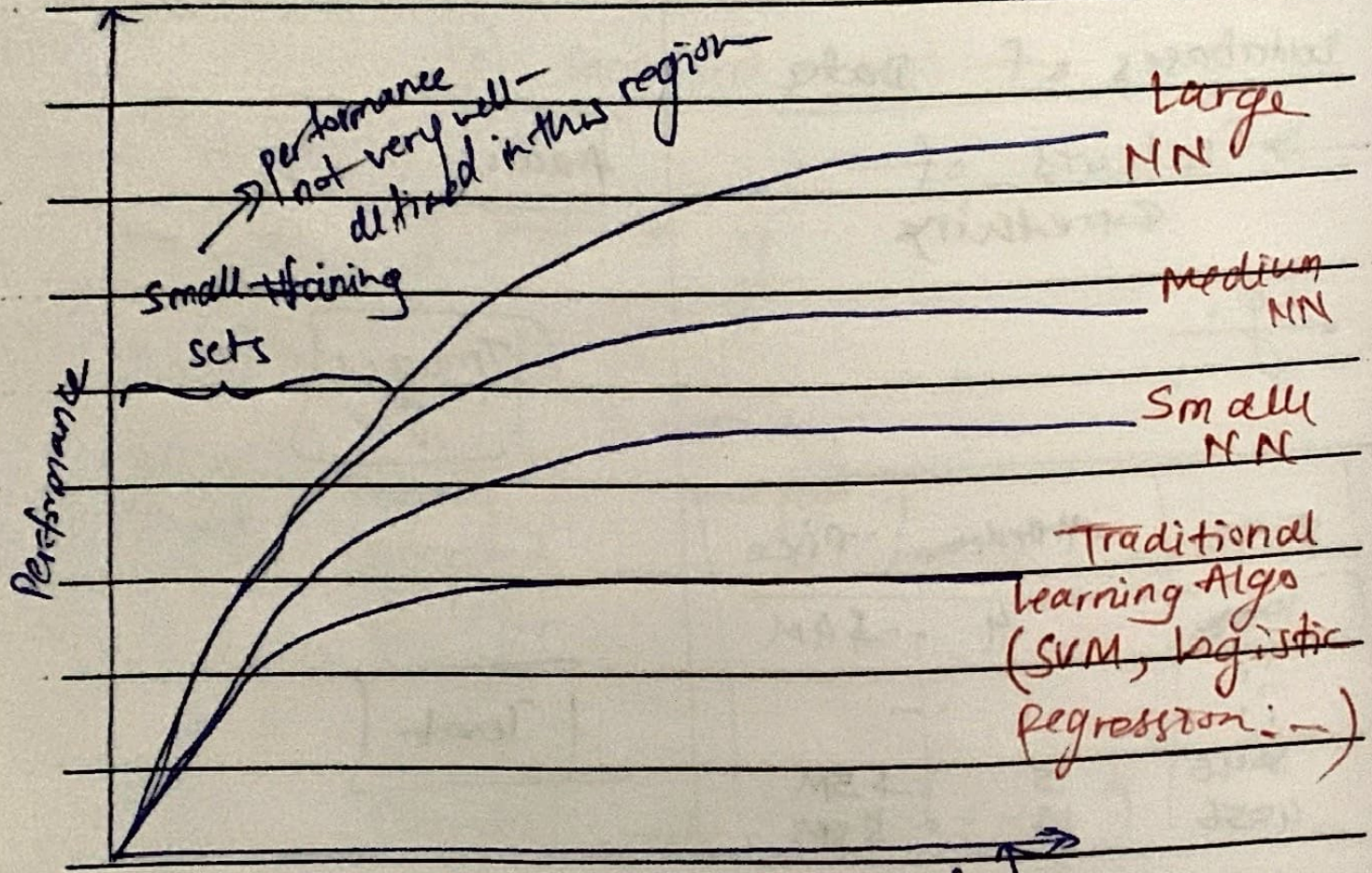
# Scale drives Deep Learning Progress :




For a high level performance :

→ you need a Large NN architecture

→ A lot of data

Size of NN ↑

Scale of data ↑

This switch make gradient descent work much faster.

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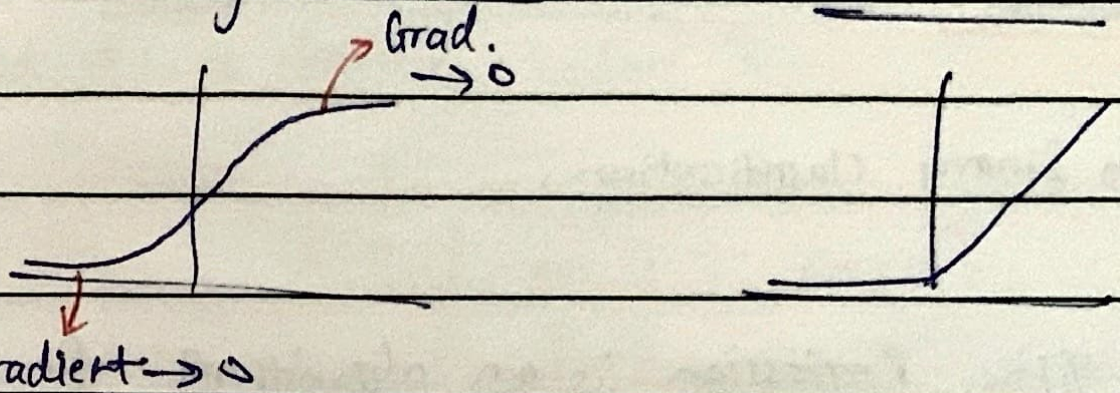
Sigmoid function to ReLU function




1. Learning becomes very slow. for Sigmoid. while, for ReLU function, the gradient is alway 1 for all the inputs.

Better algorithms → Computation faster, when large data